

Amendments to the Specification

Please replace the paragraph at page 22, line 16 through page 23, line 8 with the following amended paragraph:

Figs. 4A and 4B comprise a flowchart that summarizes an embodiment of the present invention employing the Viterbi inference algorithm for SLDSs, as described above. The steps are as follows:

Initialize LDS state estimates $\hat{x}_{0 -1,i}$ and $\Sigma_{0 -1,i}$;	(Step 102)
Initialize $J_{0,i}$.	(Step 102)
for $i = 1:T-1$ <u>for $t = 1:T-1$</u>	(Steps 104, 122)
for $j = 1:S$ <u>for $i = 1:S$</u>	(Steps 106, 120)
for $j = 1:S$	(Steps 108, 114)
Predict and filter LDS state estimates	
$\hat{x}_{t i,t,j}$ and $\Sigma_{t i,t,j}$	(Step 110)
Find $j \rightarrow i$ “transition probability” $J_{t i-1,i,j}$	
end	(Step 112)
Find best transition $J_{t,i}$, into state i ;	(Step 116)
Update sequence probabilities $J_{t,i}$ and LDS	
state estimates $\hat{x}_{t i,t,i}$ and $\Sigma_{t i,t,i}$	(Step 118)
end	
Find “best” final switching state i_{T-1}^*	(Step 124)
Backtrack to find “best” switching state sequence i_t^*	(Step 126)
Find DBN's sufficient statistics.	(Step 128)

Please replace the paragraph at page 24, line 1 through line 5 with the following amended paragraph:

Namely, for a given set of observations Y_T , a distribution $Q(X_T, S_T | \eta, Y_T)$ with an additional set of *variational parameters* h is defined such that Kullback-Leibler divergence between $Q(X_T, S_T | \eta, Y_T)$ and $P(X_T, S_T | Y_T)$ is minimized with respect to h :

$$\eta^* = \arg \min_{\eta} \sum_{S_T} \int_{X_T} Q(X_T, S_T | \eta, Y_T) \log \frac{P(X_T, S_T | Y_T)}{Q(X_T, S_T | \eta, Y_T)}.$$